

# 2022

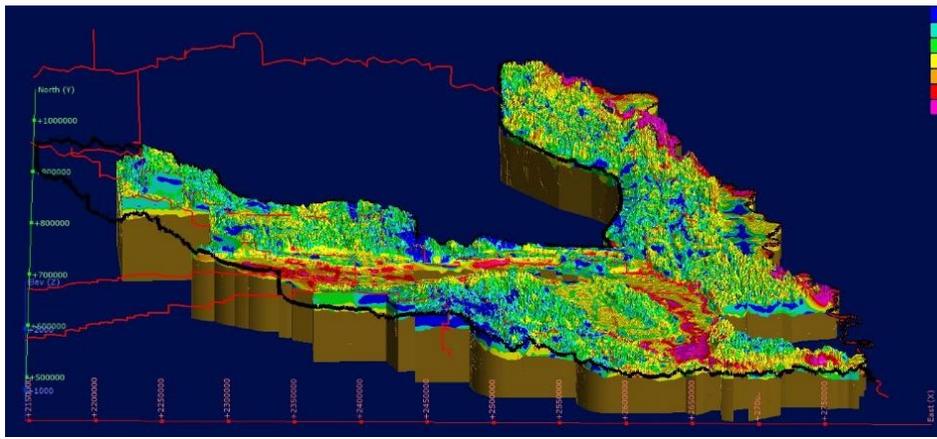
## Lower Platte North Natural Resources District

### Lower Platte Basin River Plan Report

#### Introduction

Report period is from January 1, 2021 to December 31, 2021.

#### Water Quantity Activities



Lower Platte North and Papio-Missouri River NRDs worked on a joint project with LRE developing a geologic framework model utilizing AEM (Airborne

Electromagnetic Survey) information, well logs and boreholes. The picture above shows a resistivity map with red showing the greatest and blue the lowest.

The Drought Consortium conducted a workshop, which went through a couple of scenarios on what management activities would occur with each agency during a drought. More discussion will continue in 2022 on identifying projects and procedures.

#### Well Permits Issued Approved, Cancelled or Denied

The Lower Platte North issued 33 new wells permits in 2021. There were 31 irrigation wells, which 19 were replacement: 1 municipal well and 1 domestic.

#### Water Use Information for Irrigation Wells

Total Number of Reports from Flow Meters – 1075 in 2021 compared to 1040 in 2020. Water Use from the Water Quantity Management Areas; SQS#1 – 2.14 in/ac; SQS#2 – 4.71 in/ac. Other Meters within the District – 4.57 in/ac in 2021 compared to 5.88 in/ac in 2020.

## **Water Quality Activities**

Lower Platte North worked with Dan Snow – UNL Water Center on a vadose and groundwater analysis project within LPN nitrogen management areas. The final report was completed in 2021 with conclusion from the study shown.

### Conclusions:

Based on the trends of groundwater and vadose zone nitrate levels in this area of the LPNNRD, there is clearly continued loading of nitrate to the water table. The Bellwood Phase 2, Richland and Schuyler Phase 2 and 3 Groundwater Management Areas have some of the highest groundwater nitrate concentrations of the district. Analysis of six deep vadose zone samples shows pore water nitrate concentrations with location averages ranging 8.82 from 42.55 mg/L, similar to local groundwater concentrations. Vadose zone nitrate was highest beneath cropland with continuous corn and soybeans, while alfalfa, grass, and cover crops had much lower nitrate levels. Except for 2 wells, arsenic and uranium concentrations in groundwater samples were generally below the maximum contaminant level for drinking water. Stable isotope analysis of nitrate in the groundwater and vadose zone samples indicates over half of nitrate nitrogen is likely from the overapplication of commercial fertilizer. Several samples show evidence of enrichment by denitrification, especially grab samples taken near the water table, and several have nitrogen isotope composition characteristic of a mixture of organic (manure) nitrogen and commercial fertilizer. Comparison of sites with enriched nitrogen to manure application can help confirm the importance of this source. The majority of samples, however, have nitrogen isotope composition similar to commercial (inorganic) nitrogen, and thus efforts to limit the application of fertilizer is 5 recommended. Future vadose zone and groundwater sampling in these areas will provide information on the effectiveness of any changes in nutrient management practices.

## **Water Demand Inventory**

The District is in the sixth year for obtaining required water use reports for municipalities. Industrial and other high-capacity wells report voluntarily, unless drilled after 2012. Shown on the next couple of pages are water consumption from Municipal, Industrial, Livestock and Dewatering wells.

## Municipal Water Uses

City	Total Gallons (2020)	Total Gallons (2021)
Ashland	166,488,000	120,253,000 (within LPN)
Bellwood	17,608,000	17,879,000
Newman Grove	32,796,900	36,634,547
Lindsay	79,117,800	72,164,700
Platte Center	15,949,100	16,089,370
David City	212,853,406	198,080,911
Wahoo	236,719,180	232,551,090
Yutan	46,538,000	47,582,000
Mead	23,250,000	19,098,187
Fremont	4,185,726,000	3,927,356,000 (within LPN)
North Bend	85,427,000	93,723,000
Schuyler	396,926,000	396,327,340
Cedar Bluffs	31,820,553	21,445,017
Prague	9,906,000	11,367,000
Weston	15,046,500	16,270,960
Malmo	4,056,880	3,889,950
Ithaca	7,378,000	4,480,000
Abie	2,397,700	3,325,550
Memphis	8,100,000	9,242,000
Bruno	David City total	David City total
Colon	Wahoo total	Wahoo total
Lincoln	5,174,138,440	4,380,468,900 (within LPN)
MUD West	9,417,157,000	9,629,850,000 (within LPN)
Morse Bluffs	6,127,000	3,797,000

Lower Platte North Rural Water Systems supplies drinking water to Bruno and Colon with David City and Wahoo supplying the water. The total water use is already shown under the respective communities for 2021.

## Industrial Water Uses

Well Reg	2020 Total Water Use	2021 Total Water Use		
G-153440	366,400	Not received	Butler County Landfill Inc	
G-171846	33,984,814.78	30,989,230	Western Sand and Gravel	
G-177445	146,088.52	Reading didn't change	Western Sand and Gravel	

## Livestock Uses

The NRD is obtaining numbers from the Poultry Operations. A couple of sites have dataloggers with remote reads.

Well Reg	2021 Total Water Use/Gallons	Size	Specific Use
G-152182	22,357,000	??	Cattle
G-189229	372,470	4 barns	Chickens
G-189230	275,341	8 barns	Chickens
G-185409	1,089,400.50	16 barns	Chickens
G-189228	372,090	4 barns	Chickens
G-189231	808,646	8 barns	Chickens

Couple example of water uses for livestock:

-Chicken Barn usage: 28.47-acre feet; 12 barns; 45,000 chickens to a barn; 6 flocks; 3,240,000 birds raised/ 9,276,892.56 gallons pumped; / 2.86 gallons per bird raised

-Swine: Total pumped in 2021: 28,183,700 = 86.49-acre feet

## Dewatering Wells within City of Fremont

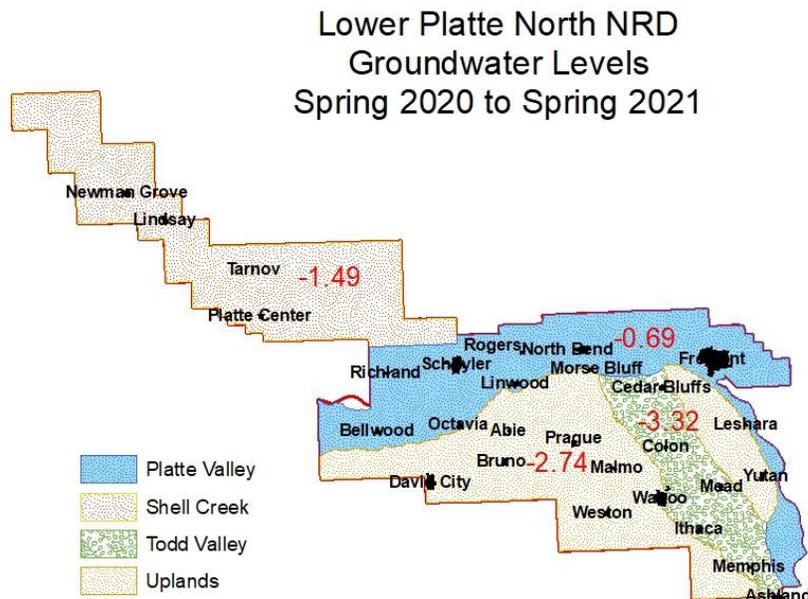
Well Reg	2020 Total Water Use/Gallons	2021 Reading Total Water Use/Gallons
G-181255	29,830,358	34,568,762
G-181192	74,748,630	16,213,509
G-0	10,201,225	Have not received
G-181257	5,153,317	9,827,796

## **Public Outreach**

The District conducted ten “coffee shop” meetings with producers in the nitrogen management areas. These meetings allowed staff to visit with producers on concerns and ideas to assist in curbing the rising nitrates in these areas. Staff assisted producers in entering their data online along with an informal survey on what best management practices they would consider if money was not an obstacle. These meetings had around 60% attendance with great conversation in a one-on-one setting.

## **Water Supply Inventory and Groundwater Elevation Data**

Water samples continue to be taken from the state network wells. All this information has been developed in a cloud base database for remote implementation.



Groundwater Levels 2020-2021 – As shown by the map, groundwater levels have declined from spring 2020, with 87% of the wells declined from the 2020 spring levels. Fall levels in 2021 did show a decline from Fall 2020.

## Certified Acres

ALL IRR	All Irrigation Ground	All Irrigation Surface	All Irrigation Commingled
<b>County</b>			
Boone	28622.40	0.00	0.00
Butler	57041.37	671.15	373.05
Colfax	53823.79	240.34	1003.89
Dodge	51034.25	84.52	599.09
Madison	5797.75	0.00	0.00
Platte	90084.90	692.15	1091.70
Saunders	105279.68	2617.39	2055.22
<b>Total</b>	<b>391684.14</b>	<b>4305.55</b>	<b>5122.95</b>
<b>HCA IRR</b>			
<b>HCA Ground</b>			
<b>HCA Surface</b>			
<b>HCA Commingled</b>			
<b>County</b>			
Boone	28622.40	0.00	0.00
Butler	45231.78	602.82	83.02
Colfax	46908.34	205.64	1003.89
Dodge	51034.25	84.52	599.09
Madison	5797.75	0.00	0.00
Platte	76867.58	692.15	1091.70
Saunders	80440.32	2545.50	1823.73
<b>Total</b>	<b>334902.42</b>	<b>4130.63</b>	<b>4601.43</b>
<b>NON HCA IRR</b>			
<b>Non_HCA Ground</b>			
<b>Non_HCA_Surface</b>			
<b>Non_HCA_Commingle</b>			
<b>County</b>			
Boone	0.00	0.00	0.00
Butler	11809.59	68.33	290.03
Colfax	6915.45	34.70	0.00
Dodge	0.00	0.00	0.00
Madison	0.00	0.00	0.00
Platte	13217.31	0.00	0.00
Saunders	24839.35	71.89	125.59
<b>Total</b>	<b>56781.70</b>	<b>174.92</b>	<b>415.62</b>

## New Depletions and Groundwater Consumptive Uses 2021 Granted, Cancelled, or Denied

Change ID	County	Township	Range	Direction	Section	Change Type	Change Date	Area	Wells	Use of irrigated acres	SDF	NIR Feet	Acre Feet Depletion
LPN-V-021-0528	Saunders	17	7	E	28	new well	10/12/2021	80		Crop Production	0.79	0.75	14.21
LPN-V-021-0529	Platte	19	2	W	27	new well	10/12/2021	40		Crop Production	0.64	0.75	5.72
LPN-V-021-0530	Saunders	15	8	E	5	new well	10/12/2021	135		Crop Production	0.9	0.75	27.24
LPN-V-021-0531	Saunders	16	7	E	16	new expansion	10/12/2021	20	G-110991	Crop Production	0.57	0.75	2.57
LPN-V-021-0533	Platte	20	4	W	26	new expansion	10/12/2021	10.17	G-030447	Crop Production	0.67	0.75	1.53
LPN-V-021-0534	Platte	19	2	W	22	new well	10/12/2021	137		Crop Production	0.57	0.75	17.64
LPN-V-021-0535	Colfax	17	2	E	16	new expansion	10/12/2021	15	G-000194	Crop Production	0.82	0.75	2.75
LPN-V-021-0536	Saunders	14	9	E	19	new well	10/12/2021	25		Crop Production	0.59	0.75	3.29
LPN-V-021-0538	Saunders	16	8	E	20	new expansion	10/12/2021	226	G-132900	Crop Production	0.79	0.75	39.56
LPN-V-021-0548	Boone	22	5	W	17	new well	10/12/2021	135		Crop Production	0.395	0.75	12.01
LPN-V-021-0549	Colfax	18	3	E	33	new expansion	10/12/2021	65	G-002292	Crop Production	0.89	0.75	13.06
LPN-V-021-0550	Saunders	15	8	E	23	new expansion	10/12/2021	25	G-015507	Crop Production	0.53	0.75	3.01
LPN-V-021-0551	Saunders	16	7	E	33	new expansion	10/12/2021	15	G-044294	Crop Production	0.84	0.75	2.85
LPN-V-021-0552	Saunders	15	7	E	23	new well	10/12/2021	80		Crop Production	0.76	0.75	13.759
LPN-V-021-0554	Saunders	17	6	E	27	new well	10/12/2021	63.44		Crop Production	0.87	0.75	12.47
LPN-V-021-0556	Saunders	16	6	E	6	new expansion	10/12/2021	6	G-159759	Crop Production	0.66	0.75	0.89
LPN-V-021-0557	Dodge	18	6	E	32	new well	10/12/2021	91		Crop Production	0.61	0.75	12.539
LPN-V-021-0559	Platte	19	2	W	15	new well	10/12/2021	34		Crop Production	0.54	0.75	4.139
LPN-V-021-0560	Platte	19	3	W	9	new expansion	10/12/2021	12.38	G-031110	Crop Production	0.78	0.75	2.181
LPN-V-021-0561	Saunders	16	7	E	23	new expansion	10/12/2021	25		Crop Production	0.83	0.75	4.681
LPN-V-021-0568	Platte	18	3	W	2	new expansion	10/12/2021	22	G-074608	Crop Production	0.74	0.75	3.67
G-144086	Boone	21	5	W	15	new expansion	4/15/2021	65.5	G-144086	Crop Production	0.59	0.75	8.68
						<b>Total Acres</b>		1327.49			<b>Total Acre Feet Depletion</b>		208.449

**Water Transfer Permit granted, Cancelled, or Denied:** None for 2021

**Stream gage measurements on District Maintained Gages:**

Lower Platte North gages are joint projects with USGS or NeDNR

**Water Banking Activities:** None for 2021

**Streamflow Accretion Activities (new projects, conjunctive management projects, etc.):** None for 2021